

**EPA Superfund
Record of Decision:**

**LAKE CITY ARMY AMMUNITION PLANT
(NORTHWEST LAGOON)
EPA ID: MO3213890012
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INDEPENDENCE, MO
09/29/1998**

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Final

Record of Decision for
Interim Remedial Action at the Northeast
Corner Operable Unit
Lake City Army Ammunition Plant
Independence, Missouri

Prepared for

Lake City Army Ammunition Plant

This ROD is for an interim action at the NECOU and is limited in scope. While it is anticipated that the components of this ROD will become part of the final action, the final ROD will provide for long-term protection of human and the environment, addressing of principal threat posed by source areas, and fully address the statutory preference for treatment. The reader should keep in mind that the ROD is a modification of the "standard ROD" format since it is interim and limited in scope.

SEPTEMBER 1998

Final Record of Decision for Interim Remedial Action at the Northeast Corner Operable Unit
Lake City Army Ammunition Plant, Independence, Missouri

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1.0 DECLARATION FOR THE RECORD OF DECISION

1.1 SITE NAME AND LOCATION

- D** Northeast Corner Operable Unit (NECOU), Lake City Army Ammunition Plant (LCAAP), National Priorities List (NPL) Site, CERCLIS #MO4213820489.
- D** Independence, Jackson County, Missouri.

1.2 STATEMENT OF BASIS AND PURPOSE

This decision document describes the selected Interim Remedial Action (IRA) for the LCAAP NECOU, in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

This decision is based on the contents of the Administrative Record for the NECOU, LCAAP. The U.S. Environmental Protection Agency (EPA) and the Missouri Department of Natural Resources (MDNR) concur with the selected Interim Action alternative.

1.3 ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the NECOU, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

1.4 SITE DESCRIPTION

The Northeast Corner Operable Unit (the subject of this IRA ROD) is a 190-acre area comprising solid waste disposal areas and burning areas. The NECOU is currently at the feasibility study stage. This ROD is for an IRA at the NECOU and is the second ROD for LCAAP.

The remedial action objectives (RAOs) for this IRA at the NECOU are:

- D** Reduce further migration of ground water containing COCs at concentrations above cleanup goals from the NECOU to the Lake City Aquifer.
- D** Minimize further migration of chemicals from the soil in the Area 17 Oil and Solvent Pits to ground water.

These RAOs are consistent with the overall NECOU management strategy which is:

- D** The use of EW-2 (or other containment components) to remediate contaminants dissolved in the ground water in the Lake City Aquifer and minimize the potential for offsite migration of contaminants in the ground water. Additional actions may be needed to address potential off-Post contamination.
- D** IRA to minimize migration of contaminated ground water from the uplands to the Lake City Aquifer. The selected alternative in this ROD includes installation of a soil cover to minimize infiltration through contaminated soil at the Area 17B Oil and Solvent Pits and installation of a PRW to intercept contaminated ground water as it moves from the NECOU toward the Lake City Aquifer.
- D** Additional studies to assess the extent of contamination at the NECOU and possible

action to mitigate source areas.

1.5 DESCRIPTION OF SELECTED REMEDY

The major components of the selected IRA for the NECOU include the following:

- D** Installation of a subsurface permeable reactive wall (PRW) to treat contaminated ground water in place (in-situ).
- D** A monitoring program to evaluate the effectiveness of the PRW in treating the contaminated ground water and to determine the replacement period of the reactive media.
- D** Installation of a soil cover over the Area 17 Oil and Solvent Pits (a principal threat waste) located adjacent to the current sanitary landfill in the NECOU to minimize infiltration of water through the pits and subsequently into ground water.

Together, these actions would reduce the potential for further migration of contaminated ground water from the NECOU to the Lake City Aquifer.

1.6 DECLARATION

This IRA is protective of human health and the environment, complies with Federal and State of Missouri applicable or relevant and appropriate requirements for this limited scope action, and is cost-effective. Although this IRA is not intended to fully address the statutory mandate for permanence and treatment to the maximum extent practicable, it does use treatment in furtherance of that statutory mandate. Because this action does not constitute the final remedy for the NECOU, the statutory preference for remedies that employ treatment to reduce toxicity, mobility, or volume as a principal element, although partially addressed in this remedy, will be addressed at the time of the final response action. Subsequent actions are planned to fully address the remaining threats posed by the NECOU.

Because this remedy will result in hazardous substances remaining on site above health-based levels, a review will be conducted within five years of the commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment. Because this is an Interim Action ROD, review of this site and of this remedy will be ongoing as the Army continues to develop final remedial alternatives for the NECOU.

1.7 SIGNATURE AND AGENCY CONCURRENCE ON THE REMEDY

Reviewed and Concurred:

Installation Remedial Project Manager

Date

Major Subordinate Command DERP PM

Date

Installation/Major Subordinated Command
Legal Advisor

Date

2.0 DECISION SUMMARY

2.1 SITE NAME AND LOCATION

LCAAP is a 3,935 acre facility in Jackson County, Missouri (Figure 1). The Department of Army is the lead agency of this CERCLA site (CERCLIS #MO4213820489). The NECOU is approximately 190 acres and is in the northeast portion of the Installation (Figure 2). Within the NECOU are landfills and other waste disposal areas.

2.2 NECOU DESCRIPTION/HISTORY AND REGULATORY OVERSIGHT ACTIVITIES

2.2.1 LCAAP Description/History

LCAAP was established in the early 1940s and was the first government-owned facility constructed to expand small arms ammunition production. Construction at the facility began on December 26, 1940 and was completed on October 11, 1941. The Plant has operated continuously since 1941, except for a 5-year period between World War II and the Korean Conflict. The operating contractor from 1941 to 1985 was Remington Arms. Olin Corporation became the operating contractor in November 1985 and continues to operate the plant on behalf of the Army.

2.2.2 NECOU Site Description/History

The NECOU is approximately 190 acres in size and is located in the northeast portion of the Installation. The majority of the NECOU source areas are situated in an upland area composed of clay and claystone. However, the western boundary of the OU is situated on an area of transition between the uplands and a lower-lying area under which the Lake City Aquifer is found. Within the NECOU, the Lake City Aquifer is located northwest of Buckner Road. This aquifer is an old stream channel beneath the ground surface consisting primarily of sand and gravel. The sand and gravel that make up this aquifer carry significant quantities of potable ground water.

Ground water is found at depths below five feet in the uplands where most of the contaminant source areas are located. Ground water in the Lake City Aquifer is generally encountered below depths of approximately two to ten feet in the NECOU.

Land use in the NECOU is primarily waste disposal areas with surrounding areas of undeveloped woodlands and fields. Land bordering the installation in the vicinity of the NECOU is comprised of farmland and several residential dwellings.

The NECOU is comprised of three areas: Area 11, Area 16, and Area 17 (Figure 3). There are ten solid waste management units (SWMUs) within these three areas. These SWMUs have been used for a variety of waste disposal activities including open burning of explosives and other waste; and landfilling of solid waste, industrial sludge, spent solvents, and paints and oils. The SWMUs consist of lagoons disposal pits and burn pits. Their locations were identified from aerial photographs spanning the period 1940 - 1990. The Area 11 Burning Grounds was a site for open burning of explosive compounds and has been closed under the State of Missouri hazardous waste regulations.

The SWMUs within the NECOU and their status are identified as follows (Figure 3):

1. Area 11 - Burning Grounds (Closed but can be used for limited safety and training procedures)
2. Area 16D - Burning Grounds (inactive)
3. Area 17C - Burning Pad (inactive)
4. Area 17D - Waste, Glass, Paint, and Solvents Area (inactive)
5. Area 17B - Oil and Solvents Pits (inactive)
6. Area 16A - Abandoned Landfill (inactive)
7. Area 16C - Firing Range (inactive)
8. Area 17E - Current Pistol Range (used for security force weapons training)
9. Area 16B - Solvent Pits (inactive)
10. Area 17A - Current Landfill (permitted sanitary landfill but not currently being used)

Analyses of soil and ground water samples collected during the RI at the NECOU indicate that Volatile Organic Compounds (VOCs), Base Neutral/Acid Extractable compounds (BNAs), explosives, and metals are present above detection limits in these media.

2.2.3 Regulatory Oversight Activities

LCAAP was proposed for listing on EPA's National Priorities List (NPL) in October 1984 with final listing in July 1987, effective August 1987. The site is jointly regulated by the EPA and the MDNR. The Army, EPA, and MDNR signed a Federal Facility Agreement (FFA) that became effective November 28, 1989, which defines the procedural framework under which LCAAP sites will be investigated and remediated, and the roles and responsibilities of the Army, EPA, and the State of Missouri regarding CERCLA response activities at the site.

2.3 HIGHLIGHTS OF COMMUNITY PARTICIPATION

Community relations activities that have taken place at LCAAP to date include:

- D** FFA process - After preparation of the FFA by the U.S. Army, EPA, and MDNR, the document was published for public review and comment. The FPA became effective November 1989.
- D** Administrative Record - Consistent with requirements of CERCLA section 113(k), an Administrative Record for information associated with CERCLA cleanup activities at LCAAP was established at LCAAP. The Administrative Record contains information used to support LCAAP decision-making associated with CERCLA issues. All documents in the Administrative Record are available to the public.
- D** Information repositories - The Administrative Record is located at the Mid-Continent Public Library, Blue Springs South Branch (public repository), and the West Gate (Building 6) at LCAAP.

- D Community Relations Plan (CRP) - The CRP was prepared pursuant to requirements in the LCAAP FFA and is being actively implemented. This plan was updated in 1996.
- D Restoration Advisory Board (RAB) - The RAB has been formed to facilitate public input in the CERCLA cleanup at, LCAAP, and meets on alternating months. In addition to U.S. Army, EPA, and State of Missouri personnel, the RAB includes community leaders and representatives from the surrounding area.
- D Mailing list - A mailing list of all interested parties in the community is maintained by LCAAP and updated regularly.
- D Fact sheet - A fact sheet describing the status of the Installation Restoration Program (IRP) was last distributed to the mailing list addressees in November 1996.
- D Proposed Plan - The Proposed Plan on this Interim Action was made available to the public for their comments.

The Remedial Investigation/Feasibility Study (RI/FS) and Proposed Plan for the LCAAP NECOU were released to the public on April 13, 1998. These documents were made available to the public in both the Administrative Record at the LCAAP and in the site Information Repository noted above. The notice of availability for these documents was published in the Independence and Blue Springs Examiner on April 11, 12, 18, and 19, 1998. A public comment period was held from April 13 to May 22, 1998, to allow the public the opportunity to make comments on the proposed Interim Action at the NECOU. In addition, a public meeting was held on May 12, 1998, where representatives of LCAAP, EPA, and MDNR were available to answer questions and accept comments regarding the remedial action under consideration. A response to the comments related to the action received during this period is included in the Responsiveness Summary, which is part of this ROD.

This ROD is based on the contents of the Administrative Record for the NECOU, in accordance with CERCLA, as amended by SARA, and the NCP. The RI/FS reports and the Proposed Plan for the NECOU provide information about the OU and the selected remedy. These documents are available at the Information Repositories at LCAAP (West Gate, Building 6) and the Mid-Continent Public Library, Blue Springs, South Branch.

2.4 SCOPE AND ROLE OF RESPONSE ACTION

As with many Superfund sites, the environmental problems at LCAAP are complex. This IRA will begin cleaning up ground water contamination at the NECOU while additional investigations to support the final action at the NECOU proceed. This Interim Action addresses part of the risk associated with exposure to contaminated ground water by containing and treating a known plume of contaminated ground water. In addition, principal threat waste sources, the Oil and Solvents pits, are being covered and contoured to address exposure to surface soil containing VOCs and reduce infiltration of precipitation. This action primarily addresses the migration of contaminated ground water into the Lake City Aquifer. The Final ROD for the NECOU will address unacceptable risks in the NECOU RI/FS.

In addition to actions related to the other OUs, LCAAP has installed an extraction well, EW-2, as a separate Response Action. EW-2 is located within the NECOU near the northern Installation boundary (Figure 4) and was installed to intercept contaminated ground water at the Installation boundary, prior to its movement off the Installation. Although not a specific component of this Interim Action remedy, EW-2 will minimize the potential for contaminated ground water from the

NECOU, already downgradient of the proposed location of the PRW, to move off-Post. The Final Action for the NECOU may incorporate the use of EW-2 as a containment component of the final remedy for the NECOU.

The RAOs for this Interim Action at the NECOU are:

- D Reduce further migration of ground water containing COCs at concentrations above cleanup goals from the NECOU to the Lake City Aquifer.
- D Minimize further migration of chemicals from the soil in the Area 17 Oil and Solvent Pits to ground water.

These RAOs are consistent with the overall NECOU management strategy which is:

- D The use of EW-2 (or other containment components) to contain and remediate contaminants dissolved in the ground water in the Lake City Aquifer and minimize the potential for offsite migration of contaminants in the ground water. Additional actions may be needed to address potential off-Post contamination.
- D An Interim Action to minimize migration of contaminated ground water from the uplands to the Lake City Aquifer. The alternative selected in this ROD includes installation of a soil cover to minimize infiltration through contaminated soil at the Area 17B Oil and Solvent Pits and installation of a PRW to intercept contaminated ground water as it moves from the NECOU toward the Lake City Aquifer.
- D Additional studies to assess the extent of contamination at the NECOU and possible action to mitigate principal threat waste sources.

2.5 SITE CHARACTERISTICS

VOC contamination at the NECOU originates from SWMUs (principal threat waste sources) in the uplands and migrates in ground water to the northwest and may have migrated off the Installation. A conceptual site model (CSM) for the NECOU is as follows:

- D Upland VOC source areas include VOCs potentially as dense non-aqueous phase liquid (DNAPL). These source areas are considered the principal threat for the NECOU. The upland sources are in areas with low permeability (less than 10^{-6} cm/sec).
- D VOCs from these sources have migrated through low yielding water bearing units to the Lake City Aquifer. Dissolved phase contaminants have been detected in the Lake City Aquifer.
- D Hydraulics of the Lake City Aquifer are influenced by LCAAP water supply wells and CERCLA remediation wells (EW-1, EW-2, and 17-FF).
- D VOCs have been detected above MCLs in ground water samples collected from monitoring wells 16-17, 16-18, and 16-19 located at the northern LCAAP boundary. In areas where contaminated ground water may have migrated off-post, no ground water users have been identified.

At the Area 17 Oil and Solvents Pits, polycyclic aromatic hydrocarbons (PAHs) and VOCs including trichloroethene (TCE), toluene, tetrachloroethene (PCE), 1,2-dichloroethene (1,2-DCE) were detected. These VOCs were detected in two of three (central and western) former disposal pits. Soil boring data indicates that the central pit contains the highest concentration and largest mass of VOCs. VOCs were detected in samples to a depth of approximately 43 feet beneath the central pit, which was the maximum depth of the borings due to auger refusal.

Shallow ground water in the vicinity of the Area 17 Oil and Solvents Pits was also determined to contain VOCs. Chemicals in ground water at the NECOU were detected at concentrations as high as

300,000, Ig/L of Specific VOCs in the immediate vicinity of the pits to approximately 1,000 Ig/L within 400 feet downgradient of the pits. VOCs from source areas in the uplands have migrated into the Lake City Aquifer and subsequently appear to be moving off the Installation. TCE and PCE were the only VOCs detected above cleanup goals (Maximum Contaminant Levels or MCLs) in the Lake City Aquifer within the NECOU. The maximum concentration of TCE detected in the Lake City Aquifer was 87 Ig/L (MCL = 5 Ig/L) and PCE was detected at a maximum concentration of 8.1 Ig/L (MCL = 5 Ig/L). Figure 4 shows an approximate representation of concentrations of chemicals detected in ground water at the NECOU.

2.6 SITE RISK SUMMARY

Based on available data, the greatest potential threat to human health and the environment is from the migration of source area contaminants to potential receptors using the Lake City Aquifer. This IRA addresses these risks but is only a partial solution to the overall environmental concerns at the NECOU. Implementing an Interim Action addresses risk from migration of contaminated ground water from a portion of the NECOU and allows cleanup of around water to begin while a strategy to cleanup the entire NECOU is developed. This Interim Action may become part of the Final Action for the NECOU.

2.6.1 Risk Assessment Process

A baseline risk assessment (BLRA) was conducted during the RI to identify receptors of concern, exposure pathways, and contaminants of concern that drive unacceptable risk to humans. A BLRA evaluates risks under current and anticipated future land uses assuming no remedial action is conducted. It should be noted that the BLRA data did not indicate the presence of contaminants off-post. Therefore, the BLRA did not consider current off-post residents potentially drinking contaminated ground water.

The assessment of human health risks for this OU considered the following topics:

- D COCs in soil and ground water samples.
- D Current and future land-use conditions.
- D Potential environmental pathways by which populations might be exposed.
- D Estimated exposure point concentrations of COCs.
- D Estimated intake levels of the COCs.
- D Toxicity of the COCs.
- D Uncertainties in the assessments of exposure, toxicity, and general risks.

Both current site uses and potential future site uses were considered. In conducting this assessment, the focus was on the health effects that could result from direct exposure to contaminants by:

- D Current workers and mowers at the Plant and workers at the permitted landfill.
- D Exposure to contaminants in surface water by current workers and mowers, workers at the permitted landfill, and offsite children who could potentially play in streams that drain surface water from the NECOU.
- D Exposure to contaminants by hunters who eat deer meat from animals that were exposed to contaminants at the NECOU.
- D Exposure to contaminants in the ground water by future industrial workers and off-Post residents.

At the NECOU, soil (surface and subsurface) and ground water samples were collected and analyzed to complete the BLRA for human and ecological receptors. COCs were identified and a determination was made as to which COCs would be retained for development of RAOs.

The COCs at the NECOU include VOCs (primarily solvents and solvent-related compounds [TCE, toluene, PCE, and DCE], in surface and subsurface soil, VOCs and their degradation products (TCE, PCE, DCE, and vinyl chloride) in ground water, and metals in surface soil.

2.6.2 Human Health Risk

The human health risk assessment identified two exposure groups (both under future land-use scenarios) that could potentially be exposed to contaminants at levels that result in unacceptable risk. The first group is off-Post residents who could potentially be exposed to solvents (TCE and its breakdown components) in the ground water by drinking the water, inhaling VOCs that volatilize out of the ground water, or through skin contact (e.g., during showering). The second group is onsite industrial workers who could potentially be exposed to solvents in the ground water by drinking untreated ground water. Data available at the time of the BLRA did not indicate off-post ground water contamination. Therefore, no unacceptable risk was identified in the BLRA for current off-post residents.

TCE is the primary solvent detected in the Lake City Aquifer contributing to unacceptable risk. TCE is a highly mobile contaminant that typically migrates through the soil into the ground water. In the environment, TCE (and other solvents found in the NECOU) gradually breaks down into various components, one of which is vinyl chloride. TCE and vinyl chloride are known to cause cancer in laboratory animals and are considered carcinogens. The BLRA conducted during the RI conservatively assumed that all TCE in ground water would break down into vinyl chloride which is more toxic than TCE and the most toxic of the TCE breakdown components. The risk calculations also conservatively assumed there would be no remediation of any LCAAP areas.

Potential cancer risks are classified by the increased probability of a person getting cancer in his or her lifetime (assuming a 70-year lifetime) from being exposed to known or suspected cancer-causing chemicals at the site. According to the NCP and EPA's Risk Assessment Guidance for Superfund (EPA/540/1-89/002), the acceptable carcinogenic risk range is between 1×10^{-4} and 1×10^{-6} . This means there is a probability of one additional case in 10,000 to one case in 1,000,000 that an individual will develop cancer above the expected normal rate of 250,000 per 1,000,000 (or one in four). Generally, the 1×10^{-6} risk level is considered the level below which the number of increased cancer occurrences from exposure to specific contaminants cannot be differentiated from other causes. Depending upon site-specific information, remediation may or may not be warranted if the total site risk lies within the acceptable risk range. The concentration of TCE found in the ground water at NECOU is associated with an excess lifetime cancer risk of 4×10^{-3} for future industrial workers. This means that if no cleanup action is taken, 4 additional persons per 1,000 have a probability of developing cancer as a result of exposure to TCE-contaminated ground water. Similarly, the excess lifetime cancer risk to future off-Post residents exposed to ground water from the NECOU is 7×10^{-4} , meaning that if no cleanup action is taken, 7 additional persons per 10,000 have a probability of developing cancer as a result of exposure to TCE-contaminated ground water. These estimates were developed by taking into account various conservative assumptions about the likelihood of a person being exposed to the untreated ground water and the toxicity of TCE. As discussed above, all TCE in ground water at the NECOU was assumed to degrade to vinyl chloride. Expressing TCE as vinyl chloride provides a more conservative risk assessment since vinyl chloride is more hazardous than TCE.

The Environmental Protection Agency and the State of Missouri have established MCLs for drinking water for many chemicals including the VOCs detected in the ground water at the NECOU. Since MCLs have been established for these chemicals (in particular, TCE and vinyl chloride), the cleanup goals for these chemicals are their respective MCLs (5 Ig/L for TCE and 2 Ig/L for vinyl chloride).

2.6.3 Ecological Risk

As part of the overall BLRA, ecological risks were also evaluated. However, it is beyond the scope of the alternatives evaluated for this IRA to address any unacceptable ecological risks which may be present in the NECOU. Any such unacceptable ecological risks will be addressed as part of the comprehensive final action for the NECOU.

2.6.4 Interim Action Risk Reduction

VOCs in ground water pose a potential risk to future commercial/industrial workers at the NECOU. Breathing vapors from untreated ground water that contains the VOCs TCE and vinyl chloride would result in unacceptable cancer risk. These same VOCs in ground water also pose a potential unacceptable risk to nearby off-Post residents under future land-use scenarios if the VOC contaminated ground water were to be used.

This Interim Action remedy will minimize the risk to future exposure groups discussed above where the baseline risk assessment showed a potential for unacceptable risks. This action will reduce overall site risk by treating the ground water in situ prior to entering the Lake City Aquifer. A soil cover over the Area 17B Oil and Solvents pits will reduce exposure to soil contaminated with VOCs and minimizes further migration of VOCs to the ground water by controlling runoff and runoff of precipitation.

Actual or threatened releases of hazardous substances from this site, if not addressed by the preferred alternative or one of the other active measures considered, may present a current or potential threat to public health, welfare, or the environment.

2.7 DESCRIPTION OF ALTERNATIVES

Superfund requires that each site remedy selected be protective of human health and the environment, be cost-effective, and comply with Applicable or Relevant and Appropriate Requirements (ARARs). The Superfund process also requires that permanent solutions to contamination problems be developed whenever possible. These solutions should reduce the volume, toxicity, or mobility of the contaminants. Emphasis is also placed on treating the wastes at the site whenever possible, and on applying innovative technologies to clean up the contaminants. Given the scope of this Interim Action, a small universe of alternatives appropriate to achieve the RAOs of this ROD were selected from the Interim FS.

Development of the FS included the identification and evaluation of technologies to see if they were applicable to the overall waste management strategy for the NECOU. The technologies were combined into alternatives for remedial action. The site is complex, and during the development of the FS additional data collected and evaluated by the Army indicated that it was appropriate to implement an interim remedial action at a portion of the NECOU. The decision to pursue an interim remedial action allows the Army to respond more quickly to reducing site risk. Some of the remedial technologies identified in the Draft FS are applicable to the Interim Remedial Action. Therefore, the Draft FS has been entered into the Administrative Record to support the interim action described in this ROD. A Final FS is being developed that will take into account this Interim Action and any additional data collected at the NECOU subsequent to the RI. Final remedial action for all of the NECOU will be addressed by the Final FS, Proposed Plan, and Record of Decision.

The Interim Action at the NECOU partially addresses the Area 17B Oil and Solvents Pits and a known contaminated ground water plume moving from the NECOU toward the Lake City Aquifer. It does not specifically address source areas or areas of contaminated ground water that may be downgradient of the proposed location of the Interim Action ground water remedy, nor does this

ROD address other source areas within the NECOU. As discussed above, these other areas will be addressed in the Final Remedial Action for the NECOU. The Interim Action alternatives meet the RAOs for the Interim Action and are consistent with the overall NECOU management strategy stated above.

Three alternatives were evaluated as part of the Interim Action for soil and ground water contamination and are discussed below.

2.7.1 Alternative 1: No Action

The no action alternative represents the baseline condition at the NECOU to which other alternatives are compared. Under this alternative, no action would be taken to reduce the amount of contamination present in the ground water and source area and no reduction of risk would be realized. Because this alternative does not reduce the risks identified in the BLRA, this alternative was not selected as the preferred Interim Remedial Action. Under this alternative, no accelerated action would be taken at the NECOU, site risk would not be reduced, and the formal process to address the entire OU would continue. The cost for No action is \$0.

2.7.2 Alternative 2: Source Area Cover/Permeable Reactive Wall (PRW)

Description

Alternative 2 is the selected alternative for Interim Action at the NECOU. Figure 4 shows the approximate location of the soil cover and PRW, while Figure 5 is a schematic of the PRW. The major components of this alternative include:

- o Installation of a soil cover over the Area 17B Oil and Solvent Pits (source area) to minimize the amount of infiltration into source area soils and subsequent movement of contaminants into the underlying ground water. The cover would consist of 18 inches of compacted earth beneath a 6-inch vegetated layer. The cover would be constructed to promote drainage off the covered area, minimize erosion of the cover, and provide long-term minimization of water infiltrating through the underlying contaminated soils. This component is similar to the cover component described in the Alternative SA/GW-2 in the Interim NECOU FS except for the composition of the cover.
- o Installation of a PRW to contain and treat a defined contaminated ground water plume within the NECOU. The wall would be keyed to bedrock to intercept and treat contaminated ground water that may migrate from upgradient sources of VOC contamination before it enters the Lake City Aquifer. PRWs degrade contaminants through chemical reactions. A design study would be required to determine the final design parameters of the wall and to determine its exact location. Soil excavated during construction of the PRW will be tested to determine whether potential contaminants in the soil exceed remediation goals. Soil that has contaminants above remediation goals will be addressed in accordance with the remedial action workplan. All other soil will be managed on-Plant. It is assumed that the reactive media, which is typically iron, may have to be replaced periodically.
- o A monitoring program will be used to evaluate the effectiveness of the PRW for treating contaminated ground water. The actual time frame for replacement of iron in the wall would also be determined from monitoring data. This component is similar to the barrier wall described in the Alternative SA/GW-3 in the Interim NECOU FS.

Major ARARs

The selected alternative will comply with ARARs with respect to its limited scope relative to final remedy for the NECOU. The oil and solvents pits area ceased use (1979) prior to the effective date of RCRA (November 1980). Therefore, while not applicable the standards are relevant and appropriate. Action-specific ARARs for installation of the cover would include RCRA requirements stated in CFR 264 for designing the cover to be less permeable than the natural subsurface soils. The interim action waiver (40 CFR 300.400 (f)(c)(1)) is being invoked for the part 264 requirements for covers. The final action for the NECOU may require intrusive activity within the oil and solvents pits, therefore a low permeability cover may be inconsistent with the final remedy.

Due to the limited scope of this interim action, which does not address soil cleanup, potential chemical-specific ARARs were not considered.

The PRW will treat contaminated ground water to meet the chemical-specific ARARs for ground water, specifically the MCLs established under the Safe Drinking Water Act and State of Missouri ground water quality standards. The wall will treat contaminated ground water to meet MCLs immediately downgradient of the wall. Therefore ARARs will be attained within the scope of this interim action.

Implementation Time and Cost

The estimated time to implement this remedy and begin meeting cleanup goals is 24 months. Ground water will be treated within the wall as it passes through and will meet clean up goals on the downgradient side of the wall. Time associated for the treatment process is insignificant, although the continued need for the wall is anticipated to be in excess of 30 years. The estimated capital cost of this remedy \$1,740,000. Annual Operation and Maintenance (O&M) cost is estimated to be \$88,000. An additional outlay of \$832,000 for replacement of the iron media is estimated for year 16 of the remedy. Total 30 year present worth is \$3,493,000.

2.7.3 Alternative 3:Source Area Cover/Ground Water Extraction Wells/Treatment at the Area 18 Ground Water Treatment Plant

Description

Alternative 3 is the contingent Interim Action remedy and would be implemented if Alternative 2 cannot be readily installed. This alternative is similar to Alternative 2 except that extraction wells or ground water recovery trenches would be used to intercept contaminated ground water instead of a PRW. Intercepted ground water would be treated at the Area 18 air stripper. Figure 4 shows the approximate location of the soil cover and extraction wells and Figure 6 is a schematic of the air stripping process. The major components are:

- o A reduced permeability cover as described under Alternative 2.
- o Ground water extraction wells or trenches south of Buckner Road. This component is similar to the ground water extraction component described in the Alternative SA/GW-2 in the Interim NECOU FS. Approximately 30 wells would be arrayed for extracting contaminated ground water. Use of extraction wells or trenches would be determined during the design phase.
- o Treatment of contaminated ground water removed from the wells or trenches at the Area 18 ground water treatment plant (air stripper with catalytic oxidation offgas treatment). The Area 18 treatment plant was designed and built with excess capacity to accept additional waste streams. Discharge from the Area 18 treatment plant will be

consistent with the requirements of LCAAP's Little Blue Valley Sewer District User Discharge Permit. Pre-design data would be required to determine the need, if any, to modify the treatment plant to effectively treat the additional waste stream from the NECOU. Costs for any additional treatment components have not been included in this ROD since the need is not known at this time.

Major ARARs

The contingent alternative will comply with ARARs with respect to its limited scope relative to final remedy for the NECOU.

The ground water extracted under this alternative would be treated at the Area 18 OU treatment plant. The discharge would meet the criteria established by the Little Blue Valley Sewer District (Appendix C). The requirements under the Safe Drinking Water Act and State of Missouri ground water quality standards would be met at the location of the wells/trenches, since the ground water would be extracted prior to entering the Lake City Aquifer. While MCLs would be attained at the location of the wells, this alternative does not address the NECOU in its entirety and will not meet ARARs as applied to the entire NECOU.

Implementation Time and Cost

The estimated time to implement this remedy and begin meeting cleanup goals is 24 months. The estimated capital cost of this remedy \$2,417,000. Annual Operation and Maintenance (O&M) cost is estimated to be \$126,000. Total 30 year present worth is \$4,354,000.

2.8 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The RAOs for this Interim Action at the NECOU are:

- ø Reduce further migration of ground water containing COCs at concentrations above cleanup goals from the NECOU to the Lake City Aquifer.
- ø Minimize further migration of chemicals from the soil in the Area 17B Oil and Solvent Pits to ground water.

These RAOs are consistent with the overall NECOU management strategy which is:

- ø The use of EW-2 (or other containment components) to remediate contaminants dissolved in the ground water in the Lake City Aquifer and minimize the potential for offsite migration of contaminants in the ground water. Additional actions may be needed to address potential off-Post contamination.
- ø Interim Action to minimize migration of contaminated ground water from the uplands to the Lake City Aquifer. The selected alternative in this ROD includes installation of a soil cover to minimize infiltration of precipitation through contaminated soil at the Area 17B Oil and Solvent Pits and installation of a PRW to intercept contaminated ground water as it moves from the NECOU toward the Lake City Aquifer.
- ø Additional studies to assess the extent of contamination at the NECOU and possible action to mitigate source areas.

Pursuant to Section 300.430(e)(9)(iii) of the NCP, the remedial action to be implemented should be selected based upon consideration of nine evaluation criteria. These criteria are as follows:

Threshold Criteria

1. Overall protection of human health and environment.
2. Compliance with ARARs.

Primary Balancing Criteria

3. Long-term effectiveness and permanence.
4. Reduction of toxicity, mobility, or volume of contamination.
5. Short-term effectiveness.
6. Implementability.
7. Cost.

Modifying Criteria

8. State acceptance.
9. Community acceptance.

The following sections provide a brief review and comparison of the remedial alternatives based on the limited scope of the Interim Action.

2.8.1 Overall Protection of Human Health and the Environment

This criterion considers whether a remedy provides adequate protection and describes how risks are mitigated through treatment, engineering, or institutional controls.

Alternatives 2 and 3 would provide adequate protection of human health and the environment by eliminating, reducing, or controlling risk through treatment and engineering controls. The selected alternative would treat contaminated ground water from the NECOU, provide a reduced permeability cover over the Oil and Solvents Pits to minimize the potential for further migration of contaminants from the soil to the ground water via infiltration of precipitation, and reduce the migration of contaminated ground water from the NECOU.

Because the no action alternative is not protective of human health and the environment, it is not considered further in this analysis as an option for this site.

2.8.2 Compliance with ARARs

Alternatives are evaluated under this criterion to assess compliance with ARARs. Applicable requirements include cleanup standards, standards of control and other substantive environmental protection requirements, and criteria or limitations promulgated under Federal or State laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstances at a CERCLA site.

Relevant and appropriate requirements address problems or situations sufficiently similar to those encountered at a CERCLA site that their use is well suited to the environmental and technical factors at a particular site. The determination of "relevant and appropriate" emphasizes the similarity and appropriateness of the requirement to a site. ARARs are grouped into these three categories:

- o Chemical-Specific ARARs are health or risk-based numerical values or methodologies which, when applied to site-specific conditions, result in establishment of the amount or concentration that may be found in, or safely discharged to, the environment.
- o Location-Specific ARARs restrict the concentration of hazardous substances or the conduct of activities solely because they are in specific locations such as flood plains,

wetlands, historic places, and sensitive ecosystems or habitats.

ø Action-Specific ARARs are usually technology or activity-based requirements or limitations on action's taken with respect to hazardous wastes.

Action and location-specific ARARs are similar for most of the alternatives. Major action-specific ARARs would include storm water management and Clean Air Act Amendments. Major location-specific ARARs would include consideration of wetlands and floodplain management requirements.

Alternatives 2 and 3 would meet their respective ARARs of Federal and State environmental laws. Under Alternative 2, ground water would be treated to meet MCLs. Under Alternative 3, extracted ground water treated at the Area 18 treatment plant would meet discharge criteria established by the Little Blue Valley Sewer District. Emissions from the catalytic oxidation offgas treatment unit would meet air discharge criteria. The Interim FS discusses ARARs in more detail.

2.8.3 Long-term Effectiveness and Permanence

This criterion considers the long-term effectiveness of alternatives in maintaining protection of human health and the environment after response action objectives have been met.

The selected alternative would reduce the hazards posed by the contaminants by intercepting and treating the contaminated ground water in situ as it migrates from the NECOU toward the Lake City Aquifer. Installation of a compacted earth cover at the Oil and Solvents Pits would minimize the migration of contaminants from the soil to the ground water by promoting drainage of surface water away from the pit area.

Alternative 3 provides similar long-term effectiveness and permanence but uses ground water extraction (ex situ) and treatment of ground water to achieve this. Alternative 3 also includes a compacted earth cover at the Oil and Solvents Pits. The treatment for both Alternatives 2 and 3 would be permanent and irreversible.

2.8.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

This criterion considers the anticipated performance of specific treatment technologies an alternative may employ.

Alternatives 2 and 3 treat and contain VOC-contaminated ground water but do not address principal threat sources. Reduction of toxicity, mobility, and volume of principal threat sources will be addressed in the final action for the NECOU. Alternative 2 uses in situ treatment that destroys the contaminants using a PRW. Alternative 3 uses extraction and ex situ treatment using air stripping. Catalytic oxidation will be used to destroy VOCs in the offgas.

2.8.5 Short-term Effectiveness

This criterion considers the effectiveness of alternatives in maintaining protection of human health and the environment during the construction of a remedy until remedial response objectives have been met.

The selected alternative uses in situ treatment to destroy VOCs in the ground water. Therefore, there are no risks of exposure to contaminants during treatment. There are slight risks of exposure to contaminated ground water under Alternative 3 since water would be extracted and piped to the Area 18 treatment plant. There is a slight risk under both alternatives for

potential exposure to contaminated soil or ground water during construction, although this would be mitigated using personal protective equipment as appropriate. This risk would be minimized through the use of personal protective equipment. There may be some minor short-term risk of exposure to waste (soil and ground water) generated during construction, prior to its ultimate disposal. Water generated during construction activities would be treated to MCLs prior to discharge or discharged to the Area 18 treatment plant. VOC-contaminated soil (>10 ppm, total chlorinated VOCs) would be containerized and disposed of at an appropriate repository.

2.8.6 Implementability

This criterion considers the administrative and technical feasibility of implementing the alternatives and the availability of necessary goods and services for implementation of the response action.

Neither of the alternatives have significant administrative difficulties that would delay implementation. Both remedies are being used to successfully address similar contaminants at other Superfund sites, and the skilled workers needed to construct the remedies are available. However, the use of reactive walls (the selected alternative) does not have the history of use that extraction wells do and installation of reactive walls is more of a specialty area. Alternative 2 is an innovative technology and will require extensive monitoring to determine its effectiveness. Since Alternative 2 is innovative it is preferred under Superfund. The need to conduct bench studies to determine final design parameters of the reactive wall could result in a longer time to implement than Alternative 3. Alternative 3 would make use of the existing treatment plant located at Area 18. This plant is anticipated to be operational for a number of years.

Alternative 3 will require an evaluation of potential plant modifications to address the additional waste stream from the NECOU. While implementation concerns are not completely defined, the Army has collected preliminary design information indicating favorable constructability of Alternative 2.

2.8.7 Cost

This criterion considers the capital and O&M costs associated with each of the alternatives. Costs were developed using Means Building Cost Index, vendor estimates, and contractor experience. Alternatives are evaluated for cost in terms of both capital costs and long-term O&M costs necessary to insure continued effectiveness of the alternatives. Capital costs include the sum of the direct capital costs (materials and labor) and indirect capital costs (engineering, licenses, permits). Long-term O&M costs include labor, materials, energy, equipment replacement, disposal, and sampling necessary to ensure the future effectiveness of the alternative.

The objective of the cost analysis is to evaluate each of the alternatives based on their ability to protect human health and the environment for additional costs that may be incurred. Costs vary between the alternatives as a result of differences in the amount of materials and the level of effort required for each alternative.

The following cost tables provide a summary of probable costs for the Interim Action alternatives. A detailed cost basis is provided in the Interim FS and Administrative Record.

Alternative 1: No Action

Total Capital Costs	\$0
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30-Year Present Value for Annual Costs	\$0
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Annual Cost = \$0
Years = 30
Discount Rate = 5%

TOTAL 30-Year Present Value \$0

Alternative 2: Source Area Cover/Permeable Reactive Wall

Capital Cost Year 1 \$1,740,000
Capital Cost Year 16 \$832,000

30-Year Present Value for Annual Costs \$1,353,000
Annual Cost = \$88,000
Years = 30
Discount Rate = 5%

TOTAL 30-Year Present Value \$3,493,000

Alternative 3: Source Area Cover/Ground Water Extraction Wells/Treatment at Area 18 OU Treatment Plant

Total Capital Costs
\$2,417,000

30-Year Present Value for Annual Costs
\$1,937,000
Annual Cost = \$105,000
Years = 30
Discount Rate = 5%

TOTAL 30-Year Present Value
\$4,354,000

2.8.8 Regulatory Acceptance

This criterion considers the support agencies preferences or concerns about the alternatives.

EPA and the State of Missouri support the selected Interim Action remedy, Alternative 2.

2.8.9 Community Acceptance

Comments offered by the public were used to assess whether the proposed alternative was acceptable to the community. The Army received no written comments during the public comment period of April 13, 1998 through May 22, 1998. Questions were posed to the Army regarding the selected remedy during the public meeting held on May 12, 1998. There were no objections to the selected remedial alternative expressed at the meeting. Questions about the remedy posed during the public meeting appeared to be satisfactorily addressed during the meeting. The questions and concerns of the community are discussed in the Responsiveness Summary, which is Appendix C of this ROD. Based on the nature of the public response, the remedy described in the Proposed Plan is acceptable to the community.

2.9 SELECTED ALTERNATIVE

Based on the requirements of CERCLA, comparative analysis using the nine criteria, public comments, and in consultation with EPA and the State, the Army has determined that the

selected Interim Action alternative for the NECOU is Alternative 2 (Source Area Cover and Permeable Reactive Wall). Alternatives 2 and 3 (the selected remedy and the contingent remedy, respectively) meet the RAOs for the Interim Action and the overall NECOU waste management strategy. Alternative 3 would be implemented as a contingent remedy should Alternative 2 not be readily implementable.

The selected remedy meets these objectives through a combination of containment of contaminated ground water (PRW treating contaminated ground water) and partial containment of a principal threat waste (cover over the Area 17B Oil and Solvents Pits). The final remedy for the NECOU will address other source areas within the NECOU, long-term implementation of institutional controls, monitoring, and CERCLA 121(b) preference for treatment of principal threat waste.

Major components of Alternative 2 are:

- o Installation of PRW to treat contaminated ground water to MCLs in place. Construction methods will be determined during the remedial design.
- o Installation of a 24-inch thick vegetated soil cover over the Area 17B Oil and Solvents Pits to provide positive drainage and minimize infiltration of water through the contaminated soil.
- o Restore disturbed areas to promote positive drainage.
- o Monitoring of the effectiveness of the PRW for treating ground water contaminated with VOCs and for determining reactive media replacement time and operation & maintenance considerations.
- o Cost to implement Alternative 2: Capital Cost of \$1,740,000 for year 1 and \$832,000 in year 16 for the replacement of reactive media. Estimated O&M cost of \$88,000 per year for 30 years with a total 30-year present worth cost is \$3,493,000.

Institutional Controls and Monitoring

Institutional controls will be implemented as specified in the Final ROD for the NECOU. Institutional controls would include: (1) issuing a continuing order to restrict onsite worker access to contaminated soil; (2) filing a notice to the deed detailing the restrictions of the continuing order; and (3) a covenant to the deed in the event of property transfer.

Monitoring of the PRW will be conducted to ensure that treatment goals are being met and to determine the replacement time for the reactive media in the PRW. A long-term monitoring program will be developed as part of the remedial design for the final action at the NECOU.

2.10 STATUTORY DETERMINATIONS

In accordance with the statutory requirements of Section 121 of CERCLA, remedial actions that are selected are required to:

- o Protect human health and the environment.
- o Comply with ARARs.
- o Be cost effective.
- o Use permanent solutions and alternative treatment technologies to the maximum extent practicable.
- o Satisfy the preference for treatment that reduces contaminant toxicity, mobility, or volume as a principal element.

The manner in which the NECOU IRA satisfies the above requirements is discussed in the following sections. The discussion of section 121 CERCLA statutory determinations is

presented in accordance with the limited scope and purpose of the Interim Action.

The Interim Action has been designed to be part of the final remedy for the NECOU. The selected remedy represents the best balance of tradeoffs among the alternatives considered with respect to pertinent criteria and the limited scope of the Interim Action. The selected remedy will be reviewed prior to implementation of a Final ROD for the NECOU to ensure that it meets the RAOs for the operable unit.

2.10.1 Protection of Human Health and the Environment

The selected remedy addresses health and environmental issues that were identified in the NECOU RI and BLRA. Specifically, the PRW:

- ø Reduces potential exposures to off-Post receptors by treating contaminated ground water at levels exceeding MCLs within LCAAP boundaries.
- ø Reduces risk by reducing the concentration of contaminants in the ground water to levels below MCLs.
- ø Provides for long-term monitoring of ground water to identify potential future risks associated with the NECOU and to monitor the effectiveness of the remedial action.

Specifically, the source area soil cover:

- ø Eliminates exposure to VOCs in the surface soil by constructing a cover over these soils.
- ø Reduces migration of VOCs in the subsurface soil which may migrate to ground water.

2.10.2 Compliance with ARARs

There are no chemical-specific ARARs for soil. Alternative 2 will meet Safe Drinking Water Act MCLs and State Ground Water Quality Standards at the location of the PRW. Action and location-specific ARARs will be met including Clean Air Act and State air quality requirements.

2.10.3 Cost Effectiveness

The selected remedy has been determined to provide overall effectiveness in reducing human health risks relative to their costs. The 30-year net present worth of Alternative 2 is \$3,493,000. The estimated cost of the selected remedy is similar to Alternative 3, but achieves the best balance of risk reduction and contaminant mass removal.

2.10.4 Utilization of Permanent Solutions and Alternative Treatment Technologies to the Extent Possible

The selected remedy meets the statutory requirement to use permanent solutions and treatment technologies to the maximum extent practical for the NECOU. EPA considers a PRW an innovative technology for the in place treatment of contaminated ground water. The selected remedy provides the best balance of tradeoffs among alternatives which are both protective and ARAR-compliant relative to the five primary balancing criteria: long-term effectiveness and permanence; reduction of toxicity, mobility, or volume of contamination; short-term effectiveness; Implementability; and cost. Section 2.8 provides a comparative analysis of these criteria relative to each alternative.

A review of the selected remedy will be performed since the selected remedy will need to be incorporated into the Final ROD for the NECOU. The review will be conducted at a time frame to insure that the remedy continues to provide adequate protection of human health and the environment. During this review, RGs and the selected alternative will be reevaluated to

ensure that they remain protective, provide a significant reduction in contamination, are cost effective, and are achievable in a reasonable time frame.

2.10.5 Preference for Treatment as a Principal Element

The selected remedy will contain ground water contaminated with VOCs and provides treatment as its principal element and is an innovative technology. The scope of the interim action remedy is limited, and does not address principal threat waste sources within the NECOU, which will be addressed in the final remedy.

2.11 DOCUMENTATION OF SIGNIFICANT CHANGES

The selected action is the same as the preferred alternative presented in the Early Remedial Action Proposed Plan for the NECOU. The remedy is considered an interim action. Therefore, "Interim" has replaced "Early" in the description of the action in this ROD.

3.0 LIST OF ACRONYMS AND ABBREVIATIONS

ARARs:	Applicable or Relevant and Appropriate Requirements
BLRA:	Baseline Risk Assessment
BNA:	Base Nuetral/Acid Extractable compounds
CERCLA:	Comprehensive Environmental Response, Compensation and Liability Act
COC:	Chemical of Concern
CRP:	Community Relations Plan
CSM:	Conceptual Site Model
DCE:	Dichloroethene
DNAPL:	Dense Non-Aqueous Phase Liquid
EPA:	Environmental Protection Agency
FFA:	Federal Facility Agreement
IRA:	Interim Remedial Action
IRP:	Installation Restoration Program
LBVSD:	Little Blue Valley Sewer District
LCAAP:	Lake City Army Ammunition Plant
MCL:	Maximum Contaminant Level
MDNR:	Missouri Department of Natural Resources
Ig/L:	Micrograms per liter
mg/L:	Milligrams per liter
NCP:	National Oil and Hazardous Substances Contingency Plan
NECOU:	Northeast Corner Operable Unit
NPL:	National Priorities List
O&M:	Operation and Maintenance
OU:	Operable Unit
PCE:	Perchloroethylene; liquids used in degreasing or paint removal.
ppm:	Parts per million by weight
PRW:	Permeable Reactive Wall
RAB:	Restoration Advisory Board
RAO:	Remedial Action Objective
RCRA:	Resource Conservation and Recovery Act
RfD:	Reference Dose
RG:	Remediation Goal
RI/FS:	Remedial Investigation/Feasibility Study
ROD:	Record of Decision
SARA:	Superfund Amendments and Reauthorization Act
SWMU:	Solid Waste Management Unit

TCA: 1,1,1,-tetrachloroethane
TCE: Trichloroethylene
VOC: Volatile Organic Compound

APPENDIX A

FIGURES

September 1998

APPENDIX B

ARAR TABLE

September 1998

SUMMARY OF ACTION SPECIFIC ARARS FOR NECOU, LCAAP

Statutory/Regulatory Citation	General Description	Specific Requirements	Status
Safe Drinking Water Act, 42 USC 300(f) National Primary Drinking Water Standards, 40 CFR Part 141	Establishes health based standards for public water systems (MCLs).	40 CFR 141.61 lists MCLs for organic COCs, including those detected at the NECOU. 40 CFR 141.62 lists MCLs for inorganic COCs, including those detected at the NECOU.	Relevant and appropriate. Ground water in aquifer is used for drinking water supply for LCAAP.
Clean Air Act, 42 USC 7401-7642 National Primary and Secondary Ambient Air Quality Standards, 40 CFR Part 50	Establishes standards for ambient air quality to protect public health and welfare.	National Ambient Air Quality Standards (NAAQSs) have been established for the following chemicals: carbon monoxide (40 CFR 50.8), lead (40 CFR 50.12), nitrogen dioxide (40 CFR 50.11), particulate matter (40 CFR 50.6), ozone (40 CFR 50.9), and sulfur dioxide (40 CFR 50.4 and 40 CFR 50.5).	Applicable to contingency remedy. Applies to air emissions from the Area 18 treatment plant.
National Emission Standards for Hazardous Air Pollutants, 40 CFR Part 61 (Missouri 10 CSR 10-6.080)	Establishes emissions standards for specific air pollutants.	Sets emission standards for benzene (40 CFR 61.342), beryllium (40 CFR 61.32, mercury (40 CFR 61.52), and vinyl chloride (40 CFR 61.63). 10 CSR 10-6.080 adopts the requirements of 40 CFR 61 for these constituents.	Relevant and appropriate to contingency remedy. Relevant and appropriate to air emissions from the Area 18 treatment plant.
Resource Conservation and Recovery Act Identification and Listing of Hazardous Waste, 40 CFR Part 261, Subpart C	Lists contaminants and establishes concentrations that are considered characteristic hazardous waste based on the toxicity characteristic.	40 CFR 261.24 lists maximum concentrations for the toxicity characteristic for the COCs detected at the NECOU.	Applicable. Determines if excavated soil generated during remedial action is hazardous (toxic) based on its characteristics.

SUMMARY OF ACTION SPECIFIC ARARS FOR NECOU, LCAAP (CONTINUED)

Land Disposal Restrictions, 40 CFR Part 268.38 and 40 CFR Part 268 Subpart D	Identifies hazardous wastes that are restricted from land disposal and defines limited circumstances when a prohibited waste may continue to be land disposed.	40 CFR-268.38 lists specific organic toxicity characteristic wastes that are prohibited from land disposal including wastes listed as D018, D022, D029, D030, D036, D039, D040, and D043. Subpart D lists treatment standards for specific wastes that if met, allow these wastes to be land disposed.	Applicable. If excavated soil generated during implementation of the remedial action is determined be hazardous based on its characteristics and will be disposed of onsite, LDRs wilf be applicable. Also applicable to the contingency remedy for treatment residuals (sediment/sludge from the air stripper unit and spent catalyst from the catalytic oxidation unit) from the Area 18 treatment plant if the residuals are determined to be hazardous and will be disposed of onsite.
Standards Applicable to RCRA-permitted Air Strippers, 40 CFR Part 264.1032 (Subpart AA)	Limits total organic emissions from process vents.	Requires that the total organic emissions from all process vents be reduced to below 3.1 tons per year or be reduced by 95 percent by weight.	Applicable to contingency remedy. Applicable to emissions from the Area 18 air stripper if used to treat extracted ground water.
Missouri Air Pollution Control Regulations Fugitive Dust, 10 CSR 10-6.170	Restricts persons from causing or allowing fugitive dust to go beyond the premises where such dust originates.	Requires dust suppression measures (e.g., applying water) be implemented to control dust at the point of origin.	Applicable. Dust may be generated during construction of the remedy.
Ambient Air Quality Standards, 10 CSR 10-6.010	Establishes standards for ambient air quality to protect public health and welfare.	10 CSR 10-6.010 has the same requirements as 40 CFR 50 and also adds emission standards for hydrogen sulfide and sulfuric acid.	Applicable to contingency remedy. Applies to air emissions from the Area 18 treatment plant.
10 CSR 10-6.060	Requires that emission limits be established for sources emitting specific pollutants above de minimus levels specified.	Under the NECOU remedy, air emissions will be below de minimus levels for ozone emissions (measured as VOC) - 40 tons per year, and vinyl chloride emissions - 1 ton per year.	Applicable to contingency remedy. Applicable to emissions from the Area 18 air stripper if used to treat extracted ground water.
Missouri Storm Water Regulations 10 CSR 20-6.200	Regulates storm water discharges during construction activities.	Requires the use of best management practices (BMPs) for controlling storm water runoff, erosion, and sediment transport.	Applicable for regulation of storm water discharge during construction activities.

SUMMARY OF ACTION SPECIFIC ARARS FOR NECOU, LCAAP (CONTINUED)

Missouri Ground Water Well
Installation Regulations
10 CSR 23-4.060

Establishes minimum construction standards for monitoring wells and extraction wells. Although requirements for extraction wells are not specifically listed, requirements for monitoring wells listed in 10 CSR 23-4 are considered applicable to extraction wells.

Specifies material requirements, borehole preparation, well completion, decontamination requirements, general installation requirements, and other requirements that must be followed when constructing monitoring wells.

Applicable for the installation of monitoring wells as part of the remedy.

10 CSR 23-4.030

Establishes criteria for monitoring well be placed.

Specific requirements include locating so that surrounding area can be kept sanitary and provide ready access for maintenance and repairs, to provide proper drainage, in areas that do not flood, and farther than 15' from cavities used for underground utilities.

Applicable for the installation of monitoring wells as part of the remedy.

10 CSR 23-4.070

Establishes criteria that must be met in developing a monitoring well.

Specifies methods of developing wells to prevent contamination and properly develop a well.

Applicable for the installation of monitoring wells as part of the remedy.

APPENDIX C

GROUND WATER TREATMENT DISCHARGE CRITERIA

September 1998

Permit No. LB-0200-LC504

PART 1 - Effluent Limitations Continued:

J. During the period of February 21, 1997 to February 20, 2000 wastes containing any of the following substances in solution or in suspension in concentrations exceeding the maximum permissible concentration shall not be discharged through Outfall 003 to the District's system. Repeated or willful violation of these maximum limits shall be deemed sufficient to warrant enforcement action.

Parameter	Daily Maximum mg/l
pH	5 to 10.5 SI
1,1-Dichloroethane	0.026
1,1-Dichloroethene	0.035
1,2-Dichloroethene	0.400
1,1,1-Trichloroethane	0.900
Benzene	0.043
Carbon Tetrachloride	0.044
Chloroform	0.009
Ethyl Benzene	0.007
Methylene Chloride	0.030
Methylisobutyl Ketone	0.002
Toluene	0.110
Trichloroethene	0.680
Vinyl Chloride	0.250
Bis(2-Ethylhexyl)Phthalate	0.360
Chrysene	0.066
Di-N-Octyl Phthalate	0.013
2,4-Dinitrotoluene	0.006
HMX	0.002
Nitrobenzene	0.013
RDX	0.005

Antimony	0.078
Arsenic	0.030
Barium	0.856
Beryllium	0.010
Cadmium	0.200
Chromium	1.000
Copper	3.000
Lead	1.500
Nickel	1.000
Selenium	0.034
Silver	0.100
Zinc	5.000

APPENDIX D

RESPONSIVENESS SUMMARY

September 1998

Responsiveness Summary

Interim Remedial Action at the Northeast Corner Operable Unit
Lake City Army Ammunition Plant, Independence, Missouri

1. Overview

The United States Army established a public comment period from April 13 to May 22, 1998 for interested parties to review and comment on remedial alternatives considered and described in the Interim Action Proposed Plan for the Northeast Corner Operable Unit (NECOU). The Proposed Plan was prepared by the Army in cooperation with the U. S. Environmental Protection Agency (EPA) and the Missouri Department of Natural Resources (MDNR).

The Army also held a public meeting at 7:00 p.m. on May 12, 1998 at the Building 6 Conference Room at the Lake City Army Ammunition Plant (LCAAP) to outline the proposed remedy to reduce risk and control potential hazards at the NECOU.

The Responsiveness Summary provides a summary of comments and questions received from the community at the public meeting and during the public comment period as well as the Army's responses to public comments.

The Responsiveness Summary is organized into the following sections:

- ø Background on Community Involvement
- ø Summary of Comments and Questions Received During the Public Comment Period and Army Responses
- ø Remaining Concerns

The major components of the selected Interim Remedial Action for the NECOU include the following:

- ø Installation of a subsurface permeable reactive wall (PRW) to treat contaminated ground water in place (in-situ).
- ø Monitoring to evaluate the effectiveness of the PRW in treating the contaminated ground water and to determine the replacement period of the reactive media.
- ø Installation of a soil cover over the Area 17 Oil and Solvent Pits located adjacent to the current sanitary landfill in the NECOU.

Together, these actions would reduce the potential for further migration of contaminated ground water from the NECOU to the Lake City Aquifer.

2. Background on Community Involvement

In August 1987, LCAAP was listed on the EPA's National Priorities List (NPL). A Federal Facilities Agreement (FFA) was signed by the Army, EPA, and the State and went into effect on November 28, 1989. The FFA establishes a procedural framework and schedule for developing, implementing, and monitoring appropriate response actions for LCAAP.

Community relations activities that have taken place at LCAAP to date include:

- ø FFA process - After preparation of the FFA by the U. S. Army, EPA, and MDNR, the document was published for comment. The FFA became effective November 1989.
- ø Administrative Record - An Administrative Record for information was established in Building 3 at LCAAP. The Administrative Record contains information used to support Army decision-making. All the documents in the Administrative Record are available to the public.
- ø Information repositories - An Administrative Record outline is located at the Mid-Continent Public Library, Blue Springs South Branch (public repository) and at the west entrance to the Plant (Building 6).
- ø Community Relations Plan (CRP) - The CRP was prepared and has been accepted by EPA and the State of Missouri and is being implemented. This plan was updated in 1996.
- ø Restoration Advisory Board (RAB) - The RAB has been formed to facilitate public input in the cleanup and meets on alternating months. In addition to Army, EPA, and Missouri oversight personnel, the RAB includes community leaders and local representatives from the surrounding area.
- ø Mailing list - A mailing list of all interested parties in the community is maintained by LCAAP and updated regularly.
- ø Fact sheet - A fact sheet describing the status of the IRP at LCAAP was last distributed to the mailing list addressees in November 1996.
- ø Proposed Plan - The Proposed Plan on this Interim Action was made available to the public for their comments.

The Proposed Plan for this remedial action was made available for public review and copies of

the Proposed Plan were available at the May 12, 1998 public meeting. A transcript of comments, questions and responses provided during the public meeting was prepared.

3. Summary of Comments and Questions Received During the Public Comment Period and Army Response

Part I - Summary and Response to Local Community Concerns

In review of the written transcript of the public meeting, there were no community objections to the proposed remedial action indicated. No written comments were received during the public comment period.

The majority of the comments received during the public meeting were in the form of questions about the remedial investigation findings and the remedial action (i.e., what would be done, how it would be done, and what effects the action might have). Representatives of the Army were available to provide answers to the questions and also provided an overview presentation during the meeting to describe the proposed actions.

Part II - Comprehensive Response to Specific Technical, Legal and Miscellaneous Questions

There were no community objections to the proposed remedial action and there were no comments or questions from the public as a result of the May 12, 1998 public meeting.

4. Remaining Concerns

Based on review of the transcript of the oral comments received during the public meeting, there are no outstanding issues or remaining concerns associated with implementation of the proposed remedial action.